

NAVY F/A-18 CRASH SURVIVABLE FLIGHT
INCIDENT RECORDER (CSFIR)

MINUTES OF
TECHNICAL INTERCHANGE MEETING
(TIM) 17-18 MARCH 1998

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NAVY F/A-18 Crash Survivable Flight Incident Recorder (CSFIR)
TIM Summary

On 17-18 Mar 98, representatives from Boeing and Smiths Industries (SI) met in St. Louis for a Technical Interchange Meeting (TIM) in support of the Crash Survivable Flight Incident Recorder (CSFIR) integration into F/A-18C/D aircraft. A list of the TIM participants is in attachment #1.

The objective of this meeting was to coordinate changes to the draft CSFIR Interface Control Document (ICD), ICD-F/A-18-075, Revision Preliminary #2. The ICD defines the CSFIR when installed on the F/A-18 C/D aircraft.

The objective of the TIM was met. SI gained a better understanding of the DFIR emulation requirement. These understandings are listed below. However, in order for SI to scope the software development tasks necessary to integrate the VADR® on the F/A-18 aircraft further information is needed. A "Preliminary #3" revision to the Interface Control Document was generated (authored by Boeing) based on inputs from the participants of this TIM and will be reviewed prior to the next TIM.

The resulting action items from this TIM are indicated below (Page numbers refer to pages in the "Preliminary #3" ICD revision.)

<u>Action Item #</u>	<u>ICD Page</u>	<u>Paragraph / Topic</u>	<u>Action</u>
1	15	Review / rewrite par. 3.2.1.6	Boeing
2	20	Review / rewrite par. 3.2.1.11.12	Boeing
3	App. A, 5	Rewrite par. 30.1.4, Command Words 0, 1, 2	Boeing
4	App. A, 6	Rewrite par. 30.1.4, Command Words 3, 4, 5	Boeing
5	App. A, 7	Rewrite par. 30.1.4, Command Word 6	Boeing
6	App. A, 9	Rewrite par. 30.1.4, Command Words 8, 9	Boeing
7	App. A, 13	Rewrite par. 30.1.4, Command Word 14	Boeing
8	App. A, 14	Rewrite par. 30.1.4, Command Word 19	Boeing
9	App. A, 16	TBDs, par. 30.1.4, Command Words 28, 29	Smiths
10	App. A, 36-38	Provide Input, Figure 3	Smiths
11	App. A, 37	Provide Input, Figure 3	Boeing
12	App. A, 40	Prepare Figure 5	Boeing

With the resolution of open issues identified above, it is anticipated that the next F/A-18C/D CSFIR interface coordination TIM can be scheduled for the week of 13 April 98.

Specific CSFIR issues / clarifications.

1. The 1553 address pins will not be used to specify the VADR Remote Terminal Address.
2. There will be no requirements to erase DFIRS data using either the input discrete or the 1553 command.
3. The 1553 transformer center tap is not used. Transformer coupling is allowed.
4. Use of square waves for 1553 communication is allowable. A VADR hardware change will be required if sinusoidal 1553 communication is required.
5. There is no requirement to load CSFIR OFP over the MUX bus while installed on the aircraft. Specifically, the VADR does not need to implement the "reprogramming mode" (i.e.: program upload) commands in Appendix A. This also eliminates need for the OFP Hardware Interlock input discrete.
6. Data Write Protect will not be required, it is not used with DFIRS.
7. The Mission Computer looks at the VADR BIT Status once per second and looks at the Equipment Ready Discrete (ERD) if it gets no response. If the VADR is present and powered up, it has 4 seconds to finish powerup and talk on the bus before being declared failed. Any failures indicated in BIT Status even before PUB or IBIT is complete are latched by the MC. VADR must not indicate Failed in its 1553 BIT Status until testing is complete, as it does with the BIT Status output discrete, since this will cause false failure indications.
8. The Equipment Ready Discrete (ERD) will consist of the VADR 28V power output (pin 51), which will be stepped down in the A-Kit to 5 volts. The MC will see the VADR as ready or off (but never "Not Ready").
9. Earlier concerns about VADR reaction to power transients above 10 msec were alleviated because both generators are on the bus when in flight, so there won't be the transients that were expected.
10. VADR should record all messages sent to DFIRS in both the DFIRS partition and the VADR partition. The DFIRS partition will be the portion of VADR memory accessible to the MC to be download to the existing Memory Unit.
11. The VADR may interpret the DFIRS data real time and translate it into SFDR format frames, or there may be a new ground tool to convert the data to CDF or DDF format for use with existing SI ground software.
12. DFIRS Cmd 1 (set write address) is not used, each flight starts over at address zero.
13. Random Read/Write commands are not used with the DFIRS. These commands will be changed to Reserved.
14. Special Read/Write (Cmds 11,12,13) are not used with DFIRS. These commands will be changed to Reserved.

15. Boeing to check on the need for Cmd 14 (Set/Read Elapsed Time).
16. SI should provide the Navy with meaningful locations to peek and poke with Cmd 28 (Mem Inspect). Boeing to check for address range limitations for DFIRS imposed by MC.
17. SI will need to delay IBIT so the MC can see In Test status, which is sampled at one hz.
18. SI to decide meaningful data to report in HW Config Code (Wd 1 in msg 15 response).
19. If an IBIT is needed to set a fail bit, an IBIT should be needed to clear it (if the fault goes away).
20. If Beacon or DBIU test is requested, perform an IBIT and set the requested test complete bits.
21. SI to define spare bits in Wd 3, 4, and 6 in msg 15 response. These are recorded by MC and may be helpful in troubleshooting.
22. SI should consider recording a BIT Fault log (including info in msg 30 (alt, spd, attitude, time, tail#) to assist in troubleshooting. This could include Unit On Time.
23. If the MC sees In Test flag 2 times when not commanded, it will command an IBIT of the unit.
24. Boeing to check detailed operation of the Sequential Write and Read commands (cmds 4 and 8) to clarify how the pointers are to be updated and whether they should be wrapped to zero when the end of the partition is reached.

Attachment #1

Attendance List

F/A-18 Crash Survivable Flight Incident Recorder (CSFIR)

Technical Integration Meeting; 17-18 March 1998

Name	Company	Title	Phone
Amuedo, Kurt	Boeing	Thermodynamics	314 / 234-9075
Cavalli, Pat	Boeing	F/A-18 Crew Sytems	314 / 234-8021
Coons, Mark	Boeing	MC S/W Tech. Specialist	314 / 233-7189
Hitt, Jack	Boeing	F/A-18 Crew Systems	314 / 233-5204
Olson, Brad	Boeing	MC Equip. Engineer	314 / 233-7217
Otten, Bill	Smiths	Associate Program Mgr.	616 / 241-8928
Palmer, Chuck	Boeing	Recorders - Sr. Proj. Engineer	314 / 232-5466
Peterson, Bill	Smiths	S/W Engineering	616 / 241-7893
Sabo, Angie	Boeing	Materials & Processes	314 / 233-9978
Smith, Leo	Boeing	Recorders - Principal Engineer	314 / 233-2079
Tilker, Jim	Boeing	Electrical Systems	314 / 234-1067
Vermeulen, Ted	Smiths	System Engineer	616 / 241-8264